MODULE DC/DC CONVERTERS

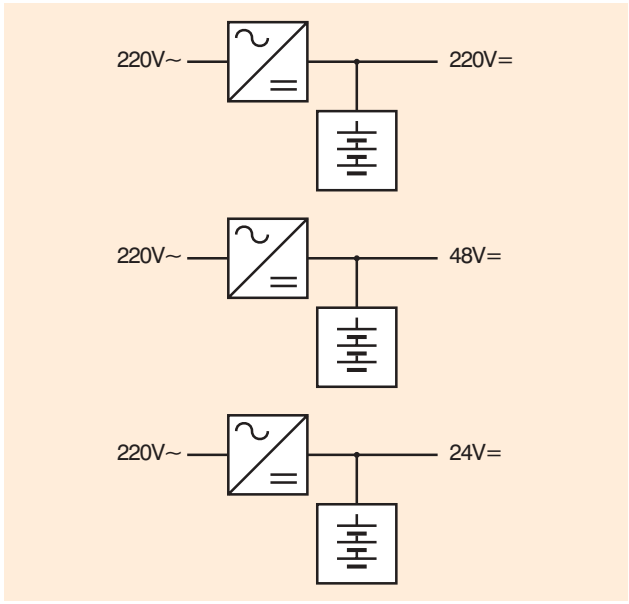
DC/DC

MEDCOM

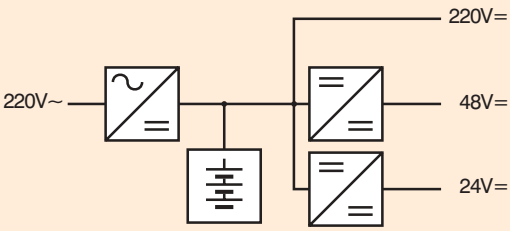
AC & DC POWER SOLUTIONS
TRACTION CONVERTERS

APPLICATION

DC/DC converters are designed to convert the voltage from a power source to the voltage required by load devices. They enable regulation output voltage.
The galvanic insulation between the input and output circuits of the DC/DC converter means that it can be used in systems of batteries and loads with opposite poles earthed or to connect an earthed system with an unearthed system.
DC/DC converters are used in 220 V (110 V) battery-powered systems in order to obtain low voltages (24 V or 48 V). The converters take advantage of redundancy to ensure a highly reliable power supply to low-voltage loads, making it unnecessary to use back-up batteries (24 V or 48 V). An uninterrupted supply to the low-voltage devices is provided by a 220 V (110 V) battery in combination with the DC/DC converter.
DC/DC converters can be used to supply high-voltage loads (220 V or 110 V) from a 24 V or 48 V battery supply. It is then unnecessary to use a 220 V or 110 V battery.
The main benefit of using DC/DC converters is a reduction in the number of battery-based supply systems with different rated voltages, which saves the costs of installing and maintaining the additional batteries. Back up time of all loads is the same.



Classic multi-battery system



Single-battery system with converters


19" Rack with DC//DC converters


DC/DC converter for mounting in 19" cabinet

STANDARDS AND CERTIFICATES

The device complies with the IEC146 standard.

An ISO9001:2000 quality certificate covers development work, design, manufacture and servicing of industrial electronic products.

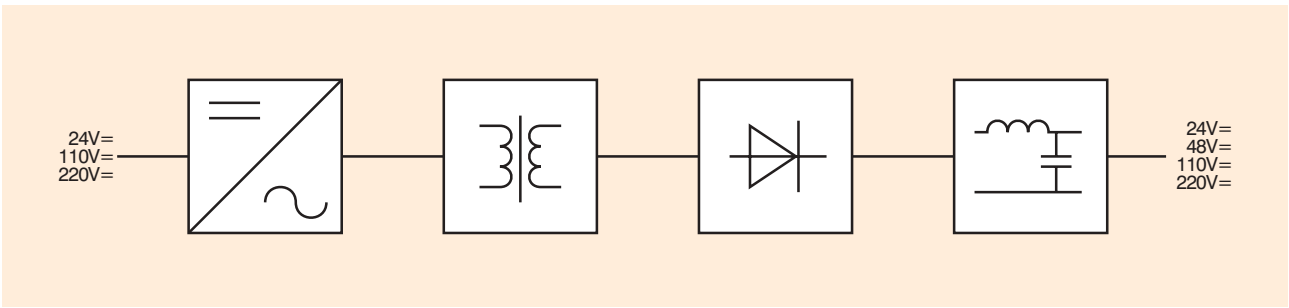
MEDCOM AC & DC POWER SOLUTIONS TRACTION CONVERTERS

PRINCIPLE OF OPERATION

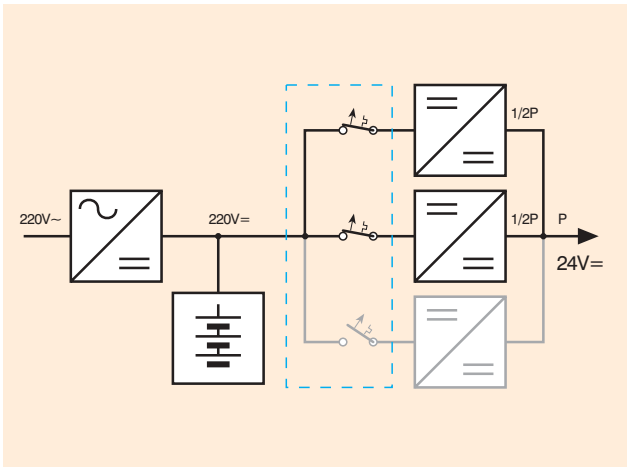
The DC/DC converter consists of a voltage inverter with transistors (IGBT or MOSFET), a high-frequency transformer, and an output rectifier with filter. The inverter converts the DC input voltage into a high-frequency AC wave. The transformer then ensures that the amplitude of this wave corresponds to the required output voltage, and provides galvanic insulation between the input and output circuits. The transformer's output voltage is rectified and filtered. The DC/DC converter's output voltage is regulated and stabilized by PWM (pulse width modulation) technology.

To increase the reliability of the output power supply, DC/DC converters are manufactured as redundant systems, e.g. with a redundancy of 2/3. This means that a single rack contains three identical DC/DC converters designed to operate in parallel. The output power of any two converters is sufficient to supply the loads. During normal operation the load is distributed between the three converters, each of them supplying one third of the output power. Should one of the converters fail, the remaining two will continue to supply power to the loads. The failed converter can then be replaced (without the need to switch off the power supply).

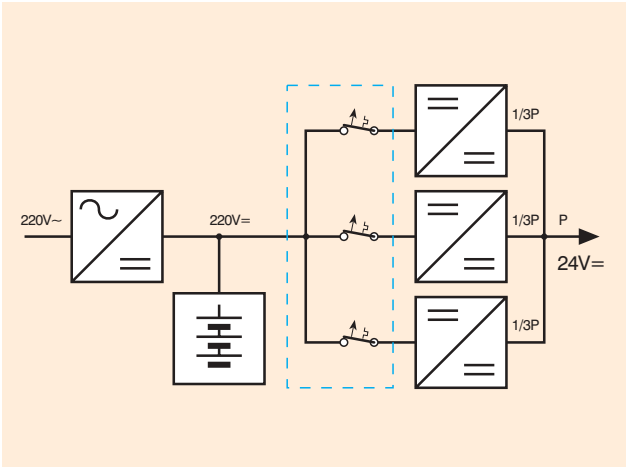
The rack containing the DC/DC converters is fitted with a set of fuses which protect the circuits of the individual converters. Versions can be produced with different levels of redundancy (1/2, 2/3) and different numbers of converters operating in parallel.



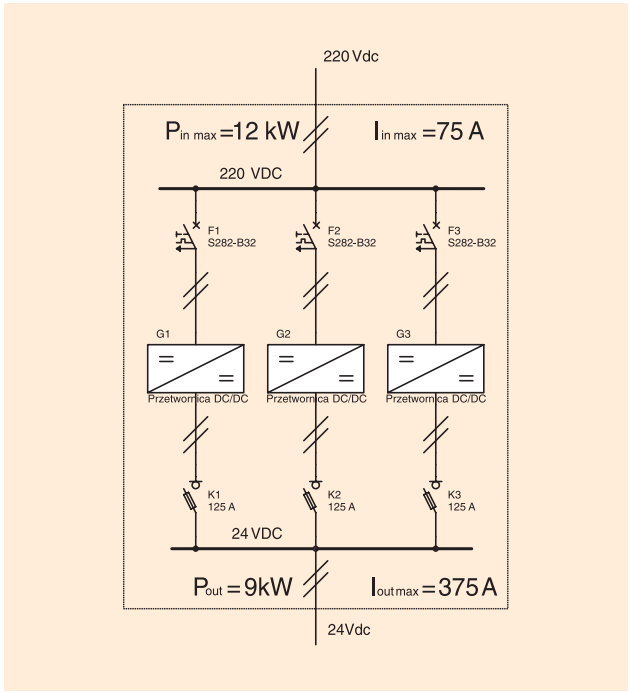
Block diagram of DC/DC converter



Redundant system (2/3) in case failure of one converter

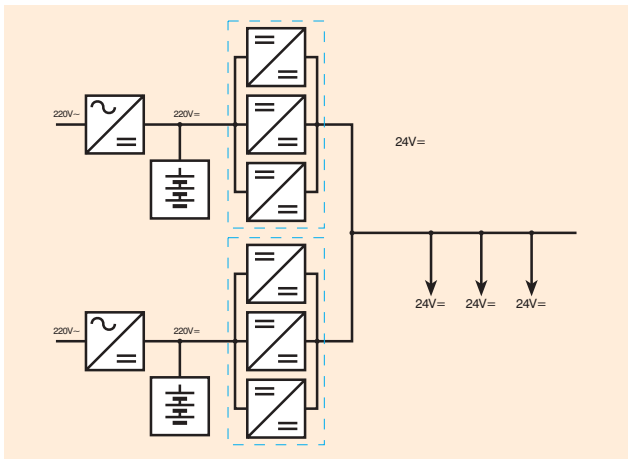


Redundant system (2/3) during normal operation



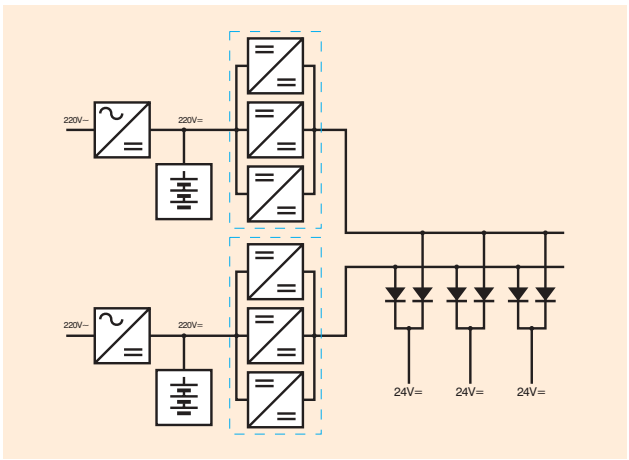
Configuration diagram: SDCDC220-24-250

SAMPLE CONFIGURATIONS OF TWO-BATTERY POWER SUPPLY SYSTEMS



Two-battery power supply system with common energy distribution bus

The two-battery system with common energy distribution bus enables loads to be powered independently from either the first or the second battery. This increases the reliability of the power supply. One of the batteries can be disconnected for maintenance or testing.



Two-battery power supply system with separate energy distribution buses

The two-battery system with separate distribution buses enables loads to be powered independently from either the first or the second battery. Electricity is supplied to each load along two lines. Immediately before each load, a diode system selects the source with the highest voltage value (earthed system). This prevents interruptions to the power supply caused by failure of one of the supply lines. The reliability of the power supply is thereby increased. One of the batteries can be disconnected for maintenance or testing.

CATALOGUE DATA

DC/DC converters — for installation in a 19" rack

Converter type	Output power	Input voltage	Output voltage	Output current
DCDC220–24–15	360 W	220 V	24 V	15 A
DCDC220–48–10	480 W	220 V	48 V	10 A
DCDC110–24–15	360 W	110 V	24 V	15 A
DCDC110–48–10	480 W	110 V	48 V	10 A
DCDC48–220–3	660 W	48 V	220 V	3 A
DCDC48–110–5	550 W	48 V	110 V	5 A
DCDC24–220–3	660 W	24 V	220 V	3 A
DCDC24–110–5	550 W	24 V	110 V	5 A

DC/DC converters — for installation in a 19" cabinet

Converter type	Output power	Input voltage	Output voltage	Output current
DCDC220–24–125	3000 W	220 V	24 V	125 A
DCDC220–48–75	3600 W	220 V	48 V	75 A
DCDC125–24–125	3000 W	125 V	24 V	125 A
DCDC125–48–75	3600 W	125 V	48 V	75 A
DCDC110–24–125	3000 W	110 V	24 V	125 A
DCDC110–48–75	3600 W	110 V	48 V	75 A

DC/DC converter systems with 2/3 redundancy — for installation in a 19" rack

Converter type	Output power	Input voltage	Output voltage	Output current
SDCDC220–24–30	720 W	220 V	24 V	30 A (45 A)
SDCDC220–48–20	960 W	220 V	48 V	20 A (30 A)
SDCDC110–24–30	720 W	110 V	24 V	30 A (45 A)
SDCDC110–48–20	960 W	110 V	48 V	20 A (30 A)

DC/DC converter systems with 2/3 redundancy — for installation in a 19" cabinet

Converter type	Output power	Input voltage	Output voltage	Output current
SDCDC220–24–250	6000 W	220 V	24 V	250 A (375 A)
SDCDC220–48–150	7200 W	220 V	48 V	150 A (225 A)
SDCDC125–24–250	6000 W	125 V	24 V	250 A (375 A)
SDCDC125–48–150	7200 W	125 V	48 V	150 A (225 A)
SDCDC110–24–250	6000 W	110 V	24 V	250 A (375 A)
SDCDC110–48–150	7200 W	110 V	48 V	150 A (225 A)

DC/DC converter systems with 1/2 redundancy — for installation in a 19" rack

Converter type	Output power	Input voltage	Output voltage	Output current
SDCDC48–220–3	660 W	48 V	220 V	3 A (6 A)
SDCDC48–110–5	550 W	48 V	110 V	5 A (10 A)
SDCDC24–220–3	660 W	24 V	220 V	3 A (6 A)
SDCDC24–110–5	550 W	24 V	110 V	5 A (10 A)

TECHNICAL PARAMETERS

DC/DC converters for installation in a 19" rack **360 – 660 W**

Power supply									
Input voltage	220 V		110 V			48 V		24 V	
Acceptable range of voltage changes (rated output parameters)	-15 % ÷ +15 %								
Acceptable range of voltage changes (operation)	-25 % ÷ +35 %								
Peak input voltage	350 V=		250 V=			160 V=		63 V=	
Dielectric test	2.8 kV 60 s								
Output parameters									
Rated output voltage	48V	24V	220V	48V	24V	220V	110V	220V	110V
Rated output current	10A	15A	3A	10A	15A	3A	6A	3A	6A
Efficiency	90 %							85 %	
Output voltage regulation	-2 % ÷ +2 %								
Over voltage protection	+10 %				Stabilization of voltage at the protection level				
Limitation of output current	1.03 In				Stabilization of current at the limit level				
Measurement									
of output current	each 10 % In				Row of LEDs				
Alarms									
Input voltage out of range	-25 % ÷ +35 %				LED marked **Input voltage OK** switches off, **Failure Alarm** relay triggered				
Output voltage out of range	-10 % ÷ +5 %				LED marked **Output voltage OK** switches off, **Disturbance Alarm** relay triggered				
Converter operating with over voltage limitation	+10 %				**Alarm** LED switches on, **Disturbance Alarm** relay triggered				
Converter operating with current limitation	1.03 In				**Alarm** LED switches on, **Disturbance Alarm** relay triggered				
Converter operating with short circuit at output	1.03 In				**Alarm** LED switches on, **Disturbance Alarm** relay triggered				
Alarm relays									
Max. operating voltage	300 V= lub 250 V~								
Max. load capacity	4 A dla 220 V~ 0.3 A dla 220 V=								
Ambient conditions (storage and operation)									
Operating temperature	0 ÷ 40 °C								
Storage temperature	15 ÷ 30 °C								
Relative humidity (noncondensing)	max. 98 %								
Installation site altitude	below 2000 m								
Air cooling	natural								
EMC	Class B								
Enclosure									
Degree of protection	IP20								
Mounting of housing	19" rack housing								
Number of slots	3					2			
Dimensions of a single slot	DCDC220-xx-xx DCDC110-xx-xx					DCDC48-xxx-x DCDC24-xxx-x			
height depth width	262 mm 232 mm 71 mm					262 mm 232 mm 106 mm			
Dimensions of box with slots height × depth × width	266 mm × 244 mm × 483 mm								

DC/DC converters for installation in a 19" cabinet **3500 – 4200 W**

Power supply					
Input voltage	220 V		125/110 V		
Acceptable range of voltage changes (rated output parameters)	-15 % ÷ +10 %		-15 % ÷ +10 %		
Acceptable range of voltage changes (operation)	-25 % ÷ +25 %		-20 % ÷ +25 %		
Peak input voltage	320 V=		200 V=		
Dielectric test (input)	2.8 kVDC 60 s		1.4 kVDC 60 s		
Dielectric test (output)	700 VDC 60 s				
Output parameters					
Output voltage rating	48 V	24 V	48 V	24 V	
Output current rating	75 A	125 A	75 A	125 A	
Efficiency	91 %		88 %		
Regulation of output voltage	-15 % ÷ +15 %				
Over voltage protection	+20 %				Stabilization of voltage at the protection level
Limitation of the output current	1.03 In				Stabilization of current at the limit level
Measurement					
of the output voltage	each 0.1 V				alphanumeric display
of the output current	each 1 A				alphanumeric display
Alarms					
Output voltage above Change of level of over voltage alarm	+14 % +8 % ÷ +20 %				LED marked **Voltage out of tolerance** switches on, message **HIGH OUTPUT** displayed, **Fault Alarm** relay triggered
Output voltage below	-2 %				LED marked **Voltage out of tolerance** switches on, message **LOW OUTPUT** displayed, **Fault Alarm** relay triggered
Input voltage below	-25 %		-20 %		LED marked **Voltage out of tolerance** switches on, message **LOW INPUT** displayed, **Fault Alarm** relay triggered
Output current above	In				LED marked **Overload** switches on, message **OVERLOAD** displayed, **Fault Alarm** and **Disturbance Alarm** relays triggered
Alarm relays					
Max. operating voltage	300 V= or 250 V~				
Max. load capacity	4 A for 220 V~ 0.3 A for 220 V=				
Ambient conditions (storage and operation)					
Operating temperature	0 ÷ 40 °C				
Storage temperature	15 ÷ 30 °C				
Relative humidity (noncondensing)	max. 98 %				
Installation site altitude	below 2000 m				
Air cooling	natural				
EMC	Class B				
Enclosure					
Degree of protection	IP20				
Mounting of housing	19" cabinet				
Number of slots	3				
Dimensions of a single slot height × depth × width	132 mm × 518 mm × 483 mm				
Dimensions of enclosure with slots height × depth × width	900 mm × 570 mm × 483 mm				

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TRACTION CONVERTERS

MEDCOM Sp. z o.o.
Founded in 1988, active in the design, manufacture, installation and servicing of modern electronic devices, aimed mainly at the power industry, military, railway and tramway transport, industry and health service customers. The use of latest technologies and system solutions, the services of highly experienced structural designers and the introduction of an ISO 9001:2000 Quality Assurance System, ensure that the devices manufactured are state-of-the-art and highly reliable. The technical design for all products is carried out in-house. In 2001 the company was awarded a prize The Polish President's Economy Award for THE BEST POLISH SMALL ENTERPRISE.

The most important products in the company's offer:

- **DC power supplies**
- **Uninterruptible power systems**
- **High-voltage power supplies**
- **Power supplies (MIL standards)**
- **Static converters for railway and tramway applications**
- **Power supplies for industrial applications**
- **Power active filters**
- **Traction battery chargers**
- **Static transfer switches**
- **“Fail-safe” power supplies**
- **Motor driving systems: AC and DC motors**
- **Measurement devices: battery earth fault meters, battery operation monitors**
- **Wind power converters**

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